



General

Guideline Title

National Athletic Trainers' Association position statement: preventing sudden death in sports.

Bibliographic Source(s)

Casa DJ, Guskiewicz KM, Anderson SA, Courson RW, Heck JF, Jimenez CC, McDermott BP, Miller MG, Stearns RL, Swartz EE, Walsh KM. National Athletic Trainers' Association position statement: preventing sudden death in sports. *J Athl Train*. 2012 Jan-Feb;47(1):96-118. [207 references] [PubMed](#)

Guideline Status

This is the current release of the guideline.

Recommendations

Major Recommendations

The Strength of Recommendation Taxonomy (SORT) (A-C) is defined at the end of the "Major Recommendations" field.

Recognizing the many reasons for sudden death allows health care providers to create and implement emergency action plans (EAPs) that provide detailed guidelines for prevention, recognition, treatment, and return to play (RTP).

The following rules apply to every EAP:

1. Every organization that sponsors athletic activities should have a written, structured EAP. *Evidence Category: B*
2. The EAP should be developed and coordinated with local emergency medical services (EMS) staff, school public safety officials, onsite first responders, school medical staff, and school administrators. *Evidence Category: B*
3. The EAP should be specific to each athletic venue. *Evidence Category: B*
4. The EAP should be practiced at least annually with all those who may be involved. *Evidence Category: B*

Those responsible for arranging organized sport activities must generate an EAP to directly focus on these items:

1. Instruction, preparation, and expectations of the athletes, parents or guardians, sport coaches, strength and conditioning coaches, and athletic directors.
2. Health care professionals who will provide medical care during practices and games and supervise the execution of the EAP with respect to medical care.
3. Precise prevention, recognition, treatment, and RTP policies for the common causes of sudden death in athletes.

Prevention and Screening

1. Athletes who may have or are suspected of having asthma should undergo a thorough medical history and physical examination (Weiler, 1996). *Evidence Category: B*
2. Athletes with asthma should participate in a structured warmup protocol before exercise or sport activity to decrease reliance on medications and minimize asthmatic symptoms and exacerbations (Reiff et al., 1989). *Evidence Category: B*
3. The sports medicine staff should educate athletes with asthma about the use of asthma medications as prophylaxis before exercise, spirometry devices, asthma triggers, recognition of signs and symptoms, and compliance with monitoring the condition and taking medication as prescribed. *Evidence Category: C*

Recognition

4. The sports medicine staff should be aware of the major asthma signs and symptoms (i.e., confusion, sweating, drowsiness, forced expiratory volume in the first second [FEV₁] of less than 40%, low level of oxygen saturation, use of accessory muscles for breathing, wheezing, cyanosis, coughing, hypotension, bradycardia or tachycardia, mental status changes, loss of consciousness, inability to lie supine, inability to speak coherently, or agitation) and other conditions (e.g., vocal cord dysfunction, allergies, smoking) that can cause exacerbations (National Heart Lung and Blood Institute [NHLBI], 2010; National Institutes of Health, NHLBI, 2002). *Evidence Category: A*
5. Spirometry tests at rest and with exercise and a field test (in the sport-specific environment) should be conducted on athletes suspected of having asthma to help diagnose the condition (Weiler, 1996; Rundell et al., 2000). *Evidence Category: B*
6. An increase of 12% or more in the FEV₁ after administration of an inhaled bronchodilator also indicates reversible airway disease and may be used as a diagnostic criterion for asthma (American Thoracic Society, 1991).

Treatment

7. For an acute asthmatic exacerbation, the athlete should use a short-acting β_2 -agonist to relieve symptoms. In a severe exacerbation, rapid sequential administrations of a β_2 -agonist may be needed. If 3 administrations of medication do not relieve distress, the athlete should be referred promptly to an appropriate health care facility (Allen, 2005). *Evidence Category: A*
8. Inhaled corticosteroids or leukotriene inhibitors can be used for asthma prophylaxis and control. A long-acting β_2 -agonist can be combined with other medications to help control asthma (Boulet, 1994). *Evidence Category: B*
9. Supplemental oxygen should be offered to improve the athlete's available oxygenation during asthma attacks (Dennis, Solarte, & Fitzgerald, 2008). *Evidence Category: B*
10. Lung function should be monitored with a peak flow meter. Values should be compared with baseline lung volume values and should be at least 80% of predicted values before the athlete may participate in activities (National Asthma Education and Prevention Program, 1997). *Evidence Category: B*
11. If feasible, the athlete should be removed from an environment with factors (e.g., smoke, allergens) that may have caused the asthma attack. *Evidence Category: C*
12. In the athlete with asthma, physical activity should be initiated at low aerobic levels and exercise intensity gradually increased while monitoring occurs for recurrent asthma symptoms. *Evidence Category: C*

Catastrophic Brain Injuries

Prevention

1. The athletic trainer (AT) is responsible for coordinating educational sessions with athletes and coaches to teach the recognition of concussion (i.e., specific signs and symptoms), serious nature of traumatic brain injuries in sport, and importance of reporting concussions and not participating while symptomatic. *Evidence Category: C*
2. The AT should enforce the standard use of certified helmets while also educating athletes, coaches, and parents that although such helmets meet a standard for helping to prevent catastrophic head injuries, they do not prevent cerebral concussions. *Evidence Category: B*

Recognition

3. The AT should incorporate the use of a comprehensive objective concussion assessment battery that includes symptom, cognitive, and balance measures. Each of these represents only one piece of the concussion puzzle and should not be used in isolation to manage concussion. *Evidence Category: A*

Treatment and Management

4. A comprehensive medical management plan for acute care of an athlete with a potential intracranial hemorrhage or diffuse cerebral edema should be implemented. *Evidence Category: B*
5. If the athlete's symptoms persist or worsen or the level of consciousness deteriorates after a concussion, the patient should be immediately referred to a physician trained in concussion management. *Evidence Category: B*
6. Oral and written instructions for home care should be given to the athlete and to a responsible adult. *Evidence Category: C*
7. Returning an athlete to participation after a head injury should follow a graduated progression that begins once the athlete is completely asymptomatic. *Evidence Category: C*
8. The athlete should be monitored periodically throughout and after these sessions to determine whether any symptoms develop or increase in intensity. *Evidence Category: C*

Cervical Spine Injuries

Prevention

1. Athletic trainers should be familiar with sport-specific causes of catastrophic cervical spine injury and understand the physiologic responses in spinal cord injury. *Evidence Category: C*
2. Coaches and athletes should be educated about the mechanisms of catastrophic spine injuries and pertinent safety rules enacted for the prevention of cervical spine injuries. *Evidence Category: C*
3. Corrosion-resistant hardware should be used in helmets, helmets should be regularly maintained throughout a season, and helmets should undergo regular reconditioning and recertification (Swartz et al., 2007). *Evidence Category: B*
4. Emergency department personnel should become familiar with proper athletic equipment removal, seeking education from sports medicine professionals regarding appropriate methods to minimize motion. *Evidence Category: C*

Recognition

5. During initial assessment, the presence of any of the following, alone or in combination, requires the initiation of the spine injury management protocol: unconsciousness or altered level of consciousness, bilateral neurologic findings or complaints, significant midline spine pain with or without palpation, or obvious spinal column deformity (Crosby, 2002; Sanchez II, Sugalski, & LaPrade, 2005; Domeier, Frederiksen, & Welch, 2005; Domier et al., 2002; Holly et al., 2002; Iida et al., 1999). *Evidence Category: A*

Treatment and Management

6. The cervical spine should be in neutral position, and manual cervical spine stabilization should be applied immediately (Crosby, 2006; Lennarson et al., 2001). *Evidence Category: B*
7. Traction must not be applied to the cervical spine (Turner, 1989; Bivins et al., 1988). *Evidence Category: B*
8. Immediate attempts should be made to expose the airway. *Evidence Category: C*
9. If rescue breathing becomes necessary, the person with the most training and experience should establish an airway and begin rescue breathing using the safest technique (Aprahamian et al., 1984; Gabbott & Baskett, 1997). *Evidence Category: B*
10. If the spine is not in a neutral position, rescuers should realign the cervical spine (Cantu, 1988; De Lorenzo et al., 1996). However, the presence or development of any of the following, alone or in combination, is a contraindication to realignment (Gabbott & Baskett, 1997; De Lorenzo, 1996): pain caused or increased by movement, neurologic symptoms, muscle spasm, airway compromise, physical difficulty repositioning the spine, encountered resistance, or apprehension expressed by the patient. *Evidence Category: B*
11. Manual stabilization of the head should be converted to immobilization using external devices such as foam head blocks (De Lorenzo et al., 1996; Chandler et al., 1992). Whenever possible, manual stabilization (Gerling et al., 2000) is resumed after the application of external devices. *Evidence Category: B*
12. Athletes should be immobilized with a long spine board or other full-body immobilization device. (Johnson, Hauswald, & Stockhoff, 1996; Luscombe & Williams, 2003). *Evidence Category: B*

Equipment-Laden Athletes

13. The primary acute treatment goals in equipment-laden athletes are to ensure that the cervical spine is immobilized in neutral position and vital life functions are accessible. Removal of helmet and shoulder pads in any equipment-intensive sport should be deferred (Donaldson et al., 1998; Prinsen, Syrotaik, & Reid, 1995; Metz, Kuhn, & Greenfield, 1998; Tierney et al., 2002) until the athlete has been transported to an emergency medical facility except in 3 circumstances (Sherbondy et al., 2006): the helmet is not properly fitted to prevent movement of the head independent of the helmet, the equipment prevents neutral alignment of the cervical spine, or the equipment prevents airway or chest access (Donaldson et al., 1998; Prinsen, Syrotaik, & Reid, 1995; Mihalik et al., 2008). *Evidence Category: C*
14. Full face-mask removal using established tools and techniques (Copeland et al., 2007; Gale, Decoster, & Swartz, 2008; Toler et al., 2010)

is executed once the decision has been made to immobilize and transport. *Evidence Category: C*

15. If possible, a team physician or AT should accompany the athlete to the hospital. *Evidence Category: C*

16. Remaining protective equipment should be removed by appropriately trained professionals in the emergency department. *Evidence Category: C*

Diabetes Mellitus

Prevention

1. Each athlete with diabetes should have a diabetes care plan that includes blood glucose monitoring and insulin guidelines, treatment guidelines for hypoglycemia and hyperglycemia, and emergency contact information. *Evidence Category: C*
2. Prevention strategies for hypoglycemia include blood glucose monitoring, carbohydrate supplementation, and insulin adjustments. *Evidence Category: B*
3. Prevention strategies for hyperglycemia are described by the American Diabetes Association (ADA) and include blood glucose monitoring, insulin adjustments, and urine testing for ketone bodies (Zinman et al., 2004). *Evidence Category: C*

Recognition

4. Hypoglycemia typically presents with tachycardia, sweating, palpitations, hunger, nervousness, headache, trembling, or dizziness; in severe cases, loss of consciousness and death can occur. *Evidence Category: C*
5. Hyperglycemia can present with or without ketosis. Typical signs and symptoms of hyperglycemia without ketosis include nausea, dehydration, reduced cognitive performance, feelings of sluggishness, and fatigue. *Evidence Category: C*
6. Hyperglycemia with ketoacidosis may include the signs and symptoms listed earlier as well as Kussmaul breathing (abnormally deep, very rapid sighing respirations characteristic of diabetic ketoacidosis), fruity odor to the breath, unusual fatigue, sleepiness, loss of appetite, increased thirst, and frequent urination. *Evidence Category: C*

Treatment and Management

7. Mild hypoglycemia (i.e., the athlete is conscious and able to swallow and follow directions) is treated by administering approximately 10–15 g of carbohydrates (e.g., 4–8 glucose tablets or 2 tablespoons of honey) and reassessing blood glucose levels immediately and 15 minutes later. *Evidence Category: C*
8. Severe hypoglycemia (i.e., the athlete is unconscious or unable to swallow or follow directions) is a medical emergency, requiring activation of EMS and, if the health care provider is properly trained, administering glucagon. *Evidence Category: C*
9. Athletic trainers should follow the ADA guidelines for athletes exercising during hyperglycemic periods. *Evidence Category: C*
10. Physicians should determine a safe blood glucose range to return an athlete to play after an episode of mild hypoglycemia or hyperglycemia. *Evidence Category: C*

Treatment Guidelines for Mild and Severe Hypoglycemia (Mitchell et al., 1988; Hargreaves et al., 1996)

Mild Hypoglycemia	Severe Hypoglycemia
<ol style="list-style-type: none">1. Give 10–15 g of fast-acting carbohydrate, e.g., 4–8 glucose tablets, 2 Tbsp honey.2. Measure blood glucose level.3. Wait 15 min and remeasure blood glucose level.4. If blood glucose level remains low, administer another 10–15 g of fast-acting carbohydrate.5. Recheck blood glucose level in 15 min.6. If blood glucose level does not return to normal after second dose of carbohydrate, activate EMS.7. Once blood glucose level normalizes, provide a snack (e.g., sandwich, bagel).	<ol style="list-style-type: none">1. Activate EMS.2. Prepare glucagon for injection, following directions in glucagon kit.3. Once athlete is conscious and able to swallow, provide food.

Exertional Heat Stroke

Prevention

1. In conjunction with preseason screening, athletes should be questioned about risk factors for heat illness or a history of heat illness. *Evidence Category: C*

2. Special considerations and modifications are needed for those wearing protective equipment during periods of high environmental stress. *Evidence Category: B*
3. Athletes should be acclimatized to the heat gradually over a period of 7 to 14 days. *Evidence Category: B*
4. Athletes should maintain a consistent level of euhydration and replace fluids lost through sweat during games and practices. Athletes should have free access to readily available fluids at all times, not only during designated breaks. *Evidence Category: B*
5. The sports medicine staff must educate relevant personnel (e.g., coaches, administrators, security guards, EMS staff, athletes) about preventing exertional heat stroke (EHS) and the policies and procedures that are to be followed in the event of an incident. Signs and symptoms of a medical emergency should also be reviewed. *Evidence Category: C*

Recognition

6. The 2 main criteria for diagnosis of EHS are (1) core body temperature of greater than 104° to 105°F (40.0° to 40.5°C) taken via a rectal thermometer soon after collapse and (2) central nervous system (CNS) dysfunction (including disorientation, confusion, dizziness, vomiting, diarrhea, loss of balance, staggering, irritability, irrational or unusual behavior, apathy, aggressiveness, hysteria, delirium, collapse, loss of consciousness, and coma). *Evidence Category: B*
7. Rectal temperature and gastrointestinal temperature (if available) are the only methods proven valid for accurate temperature measurement in a patient with EHS. Inferior temperature assessment devices should not be relied on in the absence of a valid device. *Evidence Category: B*

Treatment

8. Core body temperature must be reduced to less than 102°F (38.9°C) as soon as possible to limit morbidity and mortality. Cold-water immersion is the fastest cooling modality. If that is not available, cold-water dousing or wet ice towel rotation may be used to assist with cooling, but these methods have not been shown to be as effective as cold-water immersion. Athletes should be cooled first and then transported to a hospital unless cooling and proper medical care are unavailable onsite. *Evidence Category: B*
9. Current suggestions include a period of no activity, an asymptomatic state, and normal blood enzyme levels before the athlete begins a gradual return-to-activity progression under direct medical supervision. This progression should start at low intensity in a cool environment and slowly advance to high-intensity exercise in a warm environment. *Evidence Category: C*

Exertional Hyponatremia

Prevention

1. Each physically active person should establish an individualized hydration protocol based on personal sweat rate, sport dynamics (e.g., rest breaks, fluid access), environmental factors, acclimatization state, exercise duration, exercise intensity, and individual preferences. *Evidence Category: B*
2. Athletes should consume adequate dietary sodium at meals when physical activity occurs in hot environments. *Evidence Category: B*
3. Postexercise rehydration should aim to correct fluid loss accumulated during activity. *Evidence Category: B*
4. Body weight changes, urine color, and thirst offer cues to the need for rehydration. *Evidence Category: A*
5. Most cases of exertional hyponatremia (EH) occur in endurance athletes who ingest an excessive amount of hypotonic fluid. Athletes should be educated about proper fluid and sodium replacement during exercise. *Evidence Category: C*

Recognition

6. Athletic trainers should recognize EH signs and symptoms during or after exercise, including overdrinking, nausea, vomiting, dizziness, muscular twitching, peripheral tingling or swelling, headache, disorientation, altered mental status, physical exhaustion, pulmonary edema, seizures, and cerebral edema. *Evidence Category: B*
7. In severe cases, EH encephalopathy can occur and the athlete may present with confusion, altered CNS function, seizures, and a decreased level of consciousness. *Evidence Category: B*
8. The AT should include EH in differential diagnoses until confirmed otherwise. *Evidence Category: C*

Treatment and Management

9. If an athlete's mental status deteriorates or if he or she initially presents with severe symptoms of EH, intravenous (IV) hypertonic saline (3% to 5%) is indicated. *Evidence Category: B*
10. Athletes with mild symptoms, normal total body water volume, and a mildly altered blood sodium level (130 to 135 mEq/L; normal is 135 to 145 mEq/L) should restrict fluids and consume salty foods or a small volume of oral hypertonic solution (e.g., 3 to 5 bouillon cubes dissolved in 240 mL of hot water). *Evidence Category: C*

11. The athlete with severe EH should be transported to an advanced medical facility during or after treatment. *Evidence Category: B*
12. Return to activity should be guided by a plan to avoid future EH episodes, specifically an individualized hydration plan, as described earlier. *Evidence Category: C*

Exertional Sickling

Prevention

1. The AT should educate coaches, athletes, and, as warranted, parents about complications of exertion in the athlete with sickle cell trait (SCT). *Evidence Category: C*
2. Targeted education and tailored precautions may provide a margin of safety for the athlete with SCT. *Evidence Category: C*
3. Athletes with known SCT should be allowed longer periods of rest and recovery between conditioning repetitions, be excluded from participation in performance tests such as mile runs and serial sprints, adjust work-rest cycles in the presence of environmental heat stress, emphasize hydration, control asthma (if present), not work out if feeling ill, and have supplemental oxygen available for training or competition when new to a high-altitude environment. *Evidence Category: B*

Recognition

4. Screening for SCT, by self-report, is a standard component of the preparticipation physical evaluation (PPE) monograph. Testing for SCT, when included in the PPE or conducted previously, confirms SCT status. *Evidence Category: A*
5. The AT should know the signs and symptoms of exertional sickling, which include muscle cramping, pain, swelling, weakness, and tenderness; inability to catch one's breath; and fatigue, and be able to differentiate exertional sickling from other causes of collapse. *Evidence Category: C*
6. The AT should understand the usual settings for and patterns of exertional sickling. *Evidence Category: C*

Treatment

7. Signs and symptoms of exertional sickling warrant immediate withdrawal from activity. *Evidence Category: C*
8. High-flow oxygen at 15 L/min with a nonrebreather face mask should be administered. *Evidence Category: C*
9. The AT should monitor vital signs and activate the EAP if vital signs decline. *Evidence Category: C*
10. Sickling collapse should be treated as a medical emergency. *Evidence Category: C*
11. The AT has a duty to make sure the athlete's treating physicians are aware of the presence of SCT and prepared to treat the metabolic complications of explosive rhabdomyolysis. *Evidence Category: B*

Head-down Contact in Football

Prevention

1. Axial loading is the primary mechanism for catastrophic cervical spine injury. *Head-down contact*, defined as initiating contact with the top or crown of the helmet, is the only technique that results in axial loading. *Evidence Category: A*
2. *Spearing* is the intentional use of a head-down contact technique. Unintentional head-down contact is the inadvertent dropping of the head just before contact. Both head-down techniques are dangerous and may result in axial loading of the cervical spine and catastrophic injury. *Evidence Category: A*
3. Football helmets and other standard football equipment do not cause or prevent axial-loading injuries of the cervical spine. *Evidence Category: A*
4. Injuries that occur as a result of head-down contact are technique related and are preventable to the extent that head-down contact is preventable. *Evidence Category: C*
5. Making contact with the shoulder or chest while keeping the head up greatly reduces the risk of serious head and neck injury. With the head up, the player can see when and how impact is about to occur and can prepare the neck musculature. Even if head-first contact is inadvertent, the force is absorbed by the neck musculature, the intervertebral discs, and the cervical facet joints. This is the safest contact technique. *Evidence Category: C*
6. The game can be played as aggressively with the head up and with shoulder contact but with much less risk of serious injury. However, the technique must be learned, and to be learned, it must be practiced extensively. Athletes who continue to drop their heads just before contact need additional coaching and practice time. *Evidence Category: C*
7. Initiating contact with the face mask is a rule violation and must not be taught. If the athlete uses poor technique by lowering his head, he places himself in the head down position and at risk of serious injury. *Evidence Category: C*
8. The athlete should know, understand, and appreciate the risk of head-down contact, regardless of intent. Formal team education sessions (conducted by the AT, team physician, or both with the support of the coaching staff) should be held at least twice per season. One session

should be conducted before contact begins and the other at the midpoint of the season. Recommended topics are mechanisms of head and neck injuries, related rules and penalties, the incidence of catastrophic injury, the severity of and prognosis for these injuries, and the safest contact positions. The use of videos such as *Heads Up: Reducing the Risk of Head and Neck Injuries in Football* (National Athletic Trainers' Association, 2006) and *Tackle Progression* (USA Football, 2011) should be mandatory. Parents of high school athletes should be given the opportunity to view these videos. *Evidence Category: C*

Recognition

9. Attempts to determine a player's intent regarding intentional or unintentional head-down contact are subjective. Therefore, coaching, officiating, and playing techniques must focus on decreasing all head-down contact, regardless of intent. *Evidence Category: C*
10. Officials should enforce existing helmet contact rules to further reduce the incidence of head-down contact. A clear discrepancy has existed between the incidence of head-down or head-first contact and the level of enforcement of the helmet contact penalties. Stricter officiating would bring more awareness to coaches and players about the effects of head-down contact. *Evidence Category: B*

Lightning Safety

Prevention

1. The most effective means of preventing lightning injury is to reduce the risk of casualties by remaining indoors during lightning activity. When thunder is heard or lightning seen, people should vacate to a previously identified safe location (National Lightning Safety Institute, 1998; Holle, 2009; Bennett, Holle, & Lopez, 2010). *Evidence Category: A*
2. Establish an EAP or policy specific to lightning safety (Bennett, Holle, & Lopez, 2010; Walsh et al., 2000). *Evidence Category: C*
3. No place outdoors is completely safe from lightning, so alternative safe structures must be identified. Sites that are called "shelters" typically have at least one open side and therefore do not provide sufficient protection from lightning injury. These sites include dugouts; picnic, golf, or rain shelters; tents; and storage sheds (Holle, 2009; Rakov, 2000; Roeder & Vavrek, 2011). Safe places to be while lightning occurs are structures with 4 substantial walls, a solid roof, plumbing, and electric wiring—structures in which people live or work (Holle, 2009; Roeder & Vavrek, 2011). *Evidence Category: B*
4. Buses or cars that are fully enclosed and have windows that are completely rolled up and metal roofs can also be safe places during a lightning storm (Holle, 2008). *Evidence Category: B*
5. People should remain entirely inside a safe building or vehicle until at least 30 minutes have passed since the last lightning strike or the last sound of thunder (Cherington, 2001; Lengyel et al., 2005). *Evidence Category: A*
6. People injured by lightning strikes while indoors were touching electric devices or using a landline telephone or plumbing (e.g., showering). Garages with open doors and rooms with open windows do not protect from the effects of lightning strikes (National Lightning Safety Institute, 2011; Bennett, Holle, & Lopez, 2010; Holle et al., 1995; Duclos & Sanderson, 1990; Uman, 1986). *Evidence Category: B*

Treatment and Management

7. Victims are safe to touch and treat, but first responders must ensure their own safety by being certain the area is safe from imminent lightning strikes (Cooper, 1980; Cooper, "Myths," 1995). *Evidence Category: A*
8. Triage lightning victims who appear to be dead first. Most deaths are due to cardiac arrest (Cooper, 1980; Cooper, "Emergent," 1995; Cooper, 2011). Although those who sustain a cardiac arrest may not survive due to subsequent apnea, aggressive cardiopulmonary resuscitation (CPR) and defibrillation (if indicated) may resuscitate these patients. *Evidence Category: A*
9. Apply an automated external defibrillator (AED) and perform CPR as warranted (Cooper, 2011). *Evidence Category: A*
10. Treat for concussive injuries, fractures, dislocations, and shock (Bernhardt & Roberts, 2010; Roeder & Vavrek, 2011). *Evidence Category: A*

Sudden Cardiac Arrest

Prevention

1. Access to early defibrillation is essential. A goal of less than 3–5 minutes from the time of collapse to delivery of the first shock is strongly recommended. *Evidence Category: B*
2. The preparticipation physical examination should include the completion of a standardized history form and attention to episodes of exertional syncope or presyncope, chest pain, a personal or family history of sudden cardiac arrest or a family history of sudden death, and exercise intolerance. *Evidence Category: C*

Recognition

3. Sudden cardiac arrest (SCA) should be suspected in any athlete who has collapsed and is unresponsive. A patient's airway, breathing, circulation, and heart rhythm (using the AED) should be assessed. An AED should be applied as soon as possible for rhythm analysis.

Evidence Category: B

4. Myoclonic jerking or seizure-like activity is often present after collapse from SCA and should not be mistaken for a seizure. Occasional or agonal gasping should not be mistaken for normal breathing. *Evidence Category: B*

Management

5. CPR should be provided while the AED is being retrieved, and the AED should be applied as soon as possible. Interruptions in chest compressions should be minimized by stopping only for rhythm analysis and defibrillation. Treatment should proceed in accordance with the updated American Heart Association guidelines, (Field et al., 2010) which recommend that health care professionals follow a sequence of chest compressions (C), airway (A), and breathing (B). *Evidence Category: B*

See also Table 3, "The 12-Element American Heart Association Recommendations for Preparticipation Cardiovascular Screening of Competitive Athletes," in the original guideline document.

Definitions:

Strength of Recommendation Taxonomy (SORT)

Strength of Recommendation	Definition
A	Recommendation based on consistent and good-quality patient-oriented evidence*
B	Recommendation based on inconsistent or limited-quality experimental evidence*
C	Recommendation based on consensus, usual practice, opinion, disease-oriented evidence*, or case series for studies of diagnosis, treatment, prevention, or screening

Reprinted with permission from "Strength of Recommendation Taxonomy (SORT): A Patient-Centered Approach to Grading Evidence in the Medical Literature," February 1, 2004, American Family Physician.

*Patient-oriented evidence measures outcomes that matter to patients: morbidity, mortality, symptom improvement, cost reduction, quality of life. Disease-oriented evidence measures intermediate, physiologic, or surrogate end points that may or may not reflect improvements in patient outcomes (i.e., blood pressure, blood chemistry, physiological function, and pathological findings).

Clinical Algorithm(s)

An algorithm for asthma pharmacologic management is provided in the original guideline document.

Scope

Disease/Condition(s)

Sudden death in sports caused by the following conditions:

- Asthma
- Catastrophic brain injuries
- Cervical spine injuries
- Diabetes mellitus
- Exertional heat stroke
- Exertional hyponatremia
- Exertional sickling
- Head-down contact in football
- Lightning
- Sudden cardiac arrest

Guideline Category

Diagnosis

Evaluation

Management

Prevention

Screening

Treatment

Clinical Specialty

Cardiology

Emergency Medicine

Family Practice

Pediatrics

Preventive Medicine

Sports Medicine

Intended Users

Allied Health Personnel

Emergency Medical Technicians/Paramedics

Health Care Providers

Physicians

Guideline Objective(s)

- To provide an overview of the critical information for each condition (prevention, recognition, treatment, and return to play [RTP]) and indicate how this information should dictate the basic policies and procedures regarding the most common causes of sudden death in sports
- To guide the development of policies and procedures that can minimize the occurrence of catastrophic incidents in athletes

Target Population

High school and college athletes

Interventions and Practices Considered

1. Establishment of emergency action plans (EAPs), including screening, prevention, recognition, treatment and management of athletes who present with:
 - Asthma
 - Catastrophic brain injuries
 - Cervical spine injuries
 - Diabetes mellitus

- Exertional heat stroke
 - Exertional hyponatremia
 - Exertional sickling
 - Head-down contact in football
 - Lightning injuries
 - Sudden cardiac arrest
2. Practice and review of the EAP
 3. Return to play planning

Major Outcomes Considered

- Sensitivity and specificity of diagnostic screening and assessment tools
- Effectiveness of preventive measures
- Effectiveness of management and treatment

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

PubMed, SportsDiscus, CINAHL were searched from November 2010 to July 2011. The following key terms or most important terms associated with the statement were used: asthma, cardiac conditions, diabetes, exertional heat stroke, exertional hyponatremia, exertional sickling, head injuries, neck injuries, lightning safety, heat stroke, concussion, cardiac arrest, exercise induced asthma, hypoglycemia, sickle cell trait, C-spine injuries, water intoxication. Only top issues related to sport and physical activity were included, issues not related to exercise or physical exertion were excluded.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Not stated

Rating Scheme for the Strength of the Evidence

Not applicable

Methods Used to Analyze the Evidence

Systematic Review

Description of the Methods Used to Analyze the Evidence

Systematic review of peer-reviewed documents, via PubMed and Medline, Web of Science database searches - asthma

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Current evidence-based practices of clinical trials, expert panels for asthma control and regulations

Rating Scheme for the Strength of the Recommendations

Strength of Recommendation Taxonomy (SORT)

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Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Peer Review

Description of Method of Guideline Validation

Current evidence-based practices of clinical trials and expert panels

Evidence Supporting the Recommendations

References Supporting the Recommendations

Allen TW. Sideline management of asthma. Curr Sports Med Rep. 2005 Dec;4(6):301-4. [34 references] [PubMed](#)

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Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- Appropriate prevention, recognition, and treatment of common conditions that may result in sudden death in sports
- Development of policies and procedures that can minimize the occurrence of catastrophic incidents in athletes

Potential Harms

Not stated

Contraindications

Contraindications

Cervical Spine Injuries

The presence or development of any of the following, alone or in combination, is a contraindication to realignment of the cervical spine: pain caused or increased by movement, neurologic symptoms, muscle spasm, airway compromise, physical difficulty repositioning the spine, encountered resistance, or apprehension expressed by the patient.

Diabetes Mellitus

Exercise is contraindicated when ketones are present in the urine.

Qualifying Statements

Qualifying Statements

The National Athletic Trainers' Association (NATA) publishes its position statements as a service to promote the awareness of certain issues to its members. The information contained in the position statement is neither exhaustive nor exclusive to all circumstances or individuals. Variables such as institutional human resource guidelines, state or federal statutes, rules, or regulations, as well as regional environmental conditions, may impact the relevance and implementation of these recommendations. The NATA advises its members and others to carefully and independently consider each of the recommendations (including the applicability of same to any particular circumstance or individual). The position statement should not be relied upon as an independent basis for care but rather as a resource available to NATA members or others. Moreover, no opinion is expressed herein regarding the quality of care that adheres to or differs from NATA's position statements. The NATA reserves the right to rescind or modify its position statements at any time.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Clinical Algorithm

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Safety

Timeliness

Identifying Information and Availability

Bibliographic Source(s)

Casa DJ, Guskiewicz KM, Anderson SA, Courson RW, Heck JF, Jimenez CC, McDermott BP, Miller MG, Stearns RL, Swartz EE, Walsh KM. National Athletic Trainers' Association position statement: preventing sudden death in sports. *J Athl Train*. 2012 Jan-Feb;47(1):96-118. [207 references] [PubMed](#)

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Not stated

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This is the current release of the guideline.

Guideline Availability

Electronic copies: Available from the [National Athletic Trainers' Association \(NATA\) Web site](#) .

Availability of Companion Documents

None available

Patient Resources

None available

NGC Status

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